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THE INFLUENCE OF HEALTH STATUS TOWARDS ACADEMIC PERFORMANCE AMONG UNDERGRADUATE STUDENTS AT THE UNIVERSITI SELANGOR, MALAYSIA

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Abstract: Sustaining and improving the academic performance of university students is vital to the students as well as the university since the main aim of higher education in a broader sense is to enable society to make progress through sustaining a learning society. Besides, the health status of students could affect their academic performance. Hence, the objectives of this study are twofold; first, to identify the level of academic performance of the students; and second, to determine the relationship between health status and academic performance of the university's students. This quantitative cross-sectional study using a survey questionnaire method was performed on the 93 undergraduate students from the Bachelor of Human Resource Management (BHRM) programme at the Faculty of Business and Accountancy, Universiti Selangor (UNISEL), Malaysia. The analysis of the data indicates that this university's students have above average academic performance as the majority of the respondents scored a CGPA of between 3.00 and 3.49 pointer. Further, the results show a significant relationship exists between blood pressure, glucose level, and academic performance of the students. Maintaining a good lifestyle habit, a balanced diet, enough sleep, and regular physical activity are among the activities done by the students to achieve a good health status. This shows that, with an improved level of health-conscious, health issues are reduced, and that ultimately improves academic performance. Maintaining a good health status of students in the higher education setting is necessary to promote the practice of self-adjusting their self-awareness of their health condition. The university should provide and promote physical activity in higher education settings as physical activity has been recommended as a tool for developing students' cognitive activity which has positive effects on the brain.

Keywords: Health Status, BMI, Blood Pressure, Glucose Level, Academic Performance

1. Introduction

Academic performance is defined as the extent to which a student or an institution accomplishes specific educational goals (Kassarnig, Mones, Bjerre-Nielsen, Sapiezynski, Lassen, & Lehmann, (2018). Academic performance often depends on the indicators used in measuring it such as examinations or continuous assessment. Performance in the academic lifecycle of a student demands all facets of health status including psychological, social, emotional, spiritual, and physical well-being (Krasniqi, 2014). Previous literature suggests that

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healthier students are better learners, being healthy means that their bodies and minds function as they are supposed to (Suchert, Hanewinkel, & Isensee, 2016). They suggested that health is beneficial for both physical and mental health throughout life. However, a growing body of evidence suggests that it may also play a key role in brain health and academic performance. A healthy status is mean by mental, social well-being, and as a resource for living a full life not only to the non-appearance of disease but the capability to recover and bounce back from illness and other problems (Michalos, 2017).

A previous study suggests that it is important to pay attention to the health status of higher education students (Yubero, Navarro, Larrañaga, Esteban, Gutiérrez, & Elche, 2018) as they need to cater to internal and external study environments such as assignments/examination, lecturer, family, friends, and university lifestyle. Being healthy able to prepare them to deal with these entire environments which subsequently move away from the stress of being sick or other problems. Several studies such as Xiang, Gu, Jackson, Zhang, Wang, & Guo, (2017) suggested that students who are unhealthy are at higher risk for university problems than students who are free from health problems. Students with poor health have a higher probability of academic failure, grade retention, and dropout.

The relationship between students' health status and academic performance is complex. Inquiry to determine whether health status is related to university students' academic performance is still needed to include these elements in policies and strategies that aim to promote health among higher education students. University students in Malaysia are known to have an inactive lifestyle, as the Malaysian higher education system is very exam-oriented. Much time is also spent using mobile phones and playing video games, which reflects an inactive lifestyle (Morita, Nakajima, Okita, Ishihara, Sagawa, & Yamatsu, (2016). In response to the identified problem; therefore, the purpose of the study is to identify the level of academic performance of the students and to determine the relationship between health status and academic performance of Bachelor of Human Resource Management students in the Universiti Selangor, Malaysia.

2. Literature Review

Previous research suggests that understanding the health status of the students' population is becoming increasingly important (Laska, Pasch, Lust, Story, & Ehlinger, (2011). Understanding the health status of students will also contribute to a comprehensive knowledge base for developing education-based interventions aimed at improving the overall health status in this population. Health status is defined as the subjective assessment of the health status in which people live and feel well-being (Ware, 1976). Moving forward, Ware (1976) defined health status as a perceived health state of each individual and includes both physical and psychosocial dimensions.

Health status often puts pressure on students to perform better in academics (Sharma & Pandey, 2017). Recently, Bi, Chen, Sun, Nie, Liu, Luo, & Zhao, (2019) suggested that health status is defined as a holistic multi-dimensional concept, including physical, mental, emotional, and social functioning factors. Students are encouraged to maintain their health status by ensuring they are physically active and making it part of daily activities. The studies

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suggested that there is a relationship between health status and academic performance (Mohd Samsudin, Yusof, & Aiman, 2019). They suggested that obesity status, physical activity level, and physical fitness could not only affect health status but also academic performance among female students in Shah Alam. Hou, Liu, & Xu, (2020) revealed that exhibiting a healthy diet, adequate physical activity, and sleep, and reduced screen time, have positive associations with academic achievement regardless of body weight status. Therefore, So and Park (2016) suggested that a regular diet, reducing smoking and alcohol drinking, and physical activity should be the target when designing health interventions for improving academic performance in Korean adolescents.

On the contrary, a negative relationship between health problems and educational outcomes was found by Brännlund, Strandh, & Nilsson, (2017). Based on an American survey, Breslau, Miller, Chung, & Schweitzer, (2011) found that health problems were predictors of high school completion failure. Further, Weissman, Preston, Sebekos, Latorre, Alsaif, Krupp, & Darrow, (2016) suggested that poorer health status was associated with seriously considering dropping out of college, missing more classes during the current university year, and enrollment in more credit hours due to physical or psychological health reasons. All this evidence supported the statement by Sethu and Ramakrishnan (2018) that said healthy students learn better.

Based on the views presented in this literature review section, Figure 1 shows the research framework for this study. This study conjectures that the health status of students may influence their academic performance. In this study, health status as an independent variable is measured by using Body Mass Index (BMI), blood pressure, and glucose level. On the other hand, the dependent variable is measured by using students' academic performance. The next subsections discuss previous evidence on the relationship between BMI, blood pressure, glucose level, and academic performance.

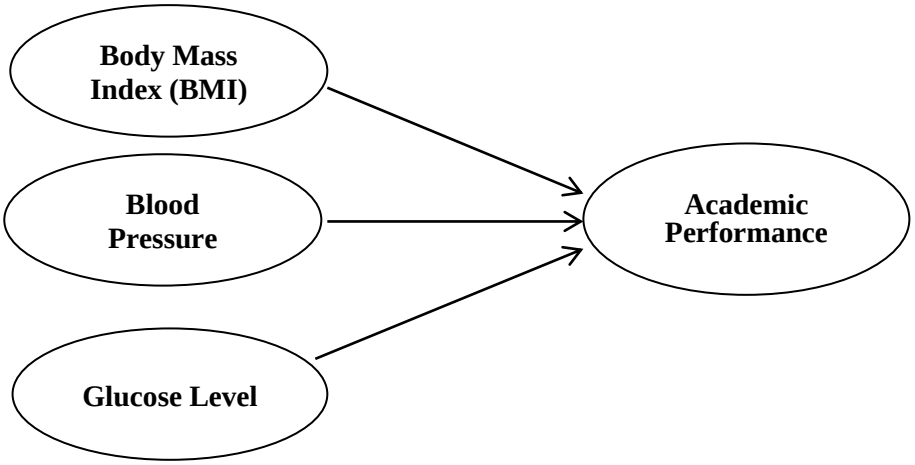

Figure 1: Conceptual Framework

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2.1 Body Mass Index (BMI) and Students' Academic Performance

Body Mass Index (BMI) is defined as a person's weight in kilograms divided by the height in meters squared (kg/m2) (Ellulu, Abed, Rahmat, Ranneh, & Ali, 2014). The World Health Organization (WHO) definition states a BMI greater than or equal to 30 is obese and a BMI greater than or equal to 25 is overweight (Ellulu et al., 2014). BMI has been widely used as an evaluation for weight status to measure obesity which means having too much body fat and adipocytes. Previous studies that aimed at exploring the relationship between obesity and academic achievement typically used BMI in their studies. Although there have been numerous empirical studies about the relationship between obesity (BMI) and academic achievement, the findings are inconsistent. For instance, Wehigaldeniya, Oshani, & Kumara, (2017) found that there is a lower significant association between BMI and academic performance of undergraduate students at the University of Kelaniya, Sri Lanka. According to them, students in the normal BMI category had significantly higher GPA scores than students in the overweight category.

Similarly, others have found an inverse relationship between BMI and academic performance (Midha, Nigam, Martolia, & Kaur, 2018; Torrijos-Niño, Martínez-Vizcaíno, Pardo-Guijarro, García-Prieto, Arias-Palencia, & Sánchez-López, 2014). Deliens, Clarys, Van Hecke, De Bourdeaudhuij, & Deforche, (2013) suggested that a higher amount of television watching and a higher frequency of eating at a friends' place were contributors to BMI increase. This argument is consistent with a finding by Lv, Lv, Bai, & Luo, (2020) whereby Chinese students' BMI was negatively associated with their academic achievement and peer acceptance played a mediating role in this relationship. On the contrary, Alswat, Al-shehri, Aljuaid, & Alasmari, (2017) found that there was no correlation between BMI and academic performance among students from Taif city, Kingdom of Saudi Arabia (KSA), except in physics results where obese students perform worse than normal-weight students. Based on these discussions, it shows that the evidence regarding the relationship between BMI and academic performance is still inconclusive. Therefore, this study conjectures the following hypothesis.

H1: There is a relationship between Body Mass Index (BMI) and students' academic performance

2.2 Blood Pressure and Students' Academic Performance

Blood pressure is defined as the amount of force at the unit area which the blood exerts on a wall of a blood vessel (Luther & Fogo, 2019). Blood pressure has clinical importance as the basic index in the medical examination of patients where it can read the hypertension level of an individual. Papathanasiou, Zerva, Zacharis, Papandreou, Papageorgiou, Tzima, & Evangelou, (2015) stated that elevated blood pressure is a significant risk factor that will contribute to the burden of heart diseases, hypertension, stroke, and kidney failure. Besides, Durrani and Farima (2015) suggested that hypertension is positively associated with physical inactivity that will be a cause of high blood pressure in a variety of populations. Numerous empirical studies about the relationship between hypertension or blood pressure and academic achievement have been conducted earlier, even though the findings are inconsistent. A study conducted by Midha et al. (2018) suggested that there is a significant

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association of hypertension, family history of hypertension, level of physical activity, and academic performance of 558 students of Government Medical College Kannauj.

Numerous studies also found a negative relationship between blood pressure and academic performance such as among students from Universities in Pakistan (Kayani, Kiyani, Wang, Zagalaz Sánchez, Kayani, & Qurban, (2018), government schools at Mahasamund district (Sharma & Pandey, 2017), and undergraduate students of Benue State University Makurdi (Muhammed, Terna, & Saanyol, 2018). Contrary, Saxena (2019) found that there was no significant effect of blood pressure on the academic performance of students of Kanpur. Additionally, she also found that the mean scores of academic performances of subjects belonging to high, moderate, and low levels of blood pressure did not differ significantly. Based on these discussions, it shows that the evidence regarding the relationship between blood pressure and academic performance is still inconclusive. Therefore, this study assumes the following hypothesis.

H2: There is a relationship between blood pressure and students' academic performance

2.3 Glucose Level and Students' Academic Performance

Glucose is a simple sugar that serves as a primary fuel for energy production especially for the brain, muscles, and several body organs and tissues (Gerstein, 1997). Normal glucose level is defined as a non-fasting blood glucose level < 200 mg/dL (Gerstein, 1997). The glucose level is assessed to read the diabetes level of an individual. According to Litchman, Edelman, & Donaldson, (2018), diabetes is the leading cause of end-stage renal disease and kidney failure posing a severe threat to public health. According to Xu et al. (2018), adults who had pre-diabetes were unaware they had it and were therefore unlikely to seek out treatment. When pre-diabetes is not diagnosed and treated accordingly, it can increase an adult's risk of heart disease, stroke, and type 2 diabetes; all of which have their own economic and quality of life burdens. Previous studies that aimed at exploring the relationship between glucose level and academic achievement found inconsistent evidence. The majority of the studies found that students who experience extreme glucose levels (e.g. hyperglycemia or hypoglycemia) perform worse on academic tasks (Knight & Perfect, 2019) and cognitive functioning (Griggs & Morris, 2018). In particular, students with diabetes have been found to have reduced performance on measures of sustained attention, psychomotor speed, intellectual performance, learning, and memory (Naguib et al., 2009).

Comparison studies are also made between diabetes and non-diabetes students. Kucera and Sullivan (2011) suggested that students with diabetes have been found to perform poorer on cognitive assessments than healthy peers. Similarly, students with high glucose levels have been shown to perform poorer academically than their non-diabetes peers (Wodrich, Hasan, & Parent, 2011). According to Parent, Wodrich, & Hasan, (2009), glucose level control is moderately correlated with teacher's ratings of academic performance, and frequent fluctuations in blood glucose levels have been identified as a possible risk factor for decreased academic performance in this population as having psychosocial problems such as missing increased amounts of school (Persson, Dahlquist, Gerdtham, & Carlsson, 2013). Based on these discussions, it shows that the evidence regarding the relationship between glucose

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level and academic performance is still inconclusive. Therefore, this study predicts the following hypothesis.

H3: There is a relationship between glucose level and students' academic performance

3. Methodology

This study employs a cross-sectional research design using a quantitative approach (Sekaran & Bougie, 2016). Besides, self-administered questionnaires have been adopted to collect data about the underlying constructs proposed in the theoretical model. The cross-sectional is used since the data was collected at one particular time across the selected respondents (Cooper & Schindler, 2008). The use of such methods may gather accurate, less biased, and high-quality data.

3.1 Data Collection Procedure

The sampling frame of this study is the list of students from the Bachelor of Human Resource Management (BHRM) programme at the Faculty of Business and Accountancy, Universiti Selangor (UNISEL), Shah Alam, Selangor, Malaysia. As of 31st March 2020, there is a total of 722 undergraduate students in this programme. This study follows the decision model table proposed by Krejcie and Morgan (1970) to determine the necessary sample size because their sample decision model is claimed to be able to provide a good sample size decision. Since the population of undergraduate students in this programme is 722 students, this research needs at least 248 respondents to initiate the indicatives of a sample for the generalisability of this research. The purposive sampling method is used in deciding the number of samples from this programme. For this study, 250 questionnaires were distributed to undergraduate students. After collecting the surveys, 93 have been returned; making the percentage of return rate is 37.2%.

3.2 Survey Instruments

The survey adopted in this study is composed of questions that determine the health status as well as the academic performance of the respondents. The survey questionnaire for the present study consists of three sections. Section A contains six questions that are designed to obtain general information about the respondents such as gender, age, marital status, race, year of study, and current CGPA. Section B comprises of independent variable items – this measures the health status such as Body Mass Index (BMI), blood pressure, and glucose level. Finally, Section C focused on the dependent variable to be tested, i.e. students' academic performance. This construct is measured on a five-point Likert scale with the anchors of (1) "strongly disagree" to (5) "strongly agree".

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The self-reported health status is measured using the Medical Outcome Study (MOS) SF-36, a well-validated 36-item questionnaire developed to provide a comprehensive measure of physical, emotional, and social well-being (Ware Jr. & Sherbourne, 1992). Health status is examined concerning increasing degrees of overweight and chronic illness status such as hypertension and diabetes. The MOS SF-36 is well known to provide a valid and reliable measure of health status and still be used today (LoMartire, Äng, Gerdle, & Vixner, 2020). According to Roberts (1995), such self-reported data with different levels of external control are quite accurate. As a preliminary analysis of the data collected, the reliability assessment of the scales was carried out by calculating the values of Cronbach's alpha for each subscale separately. According to Sekaran and Bougie (2016), the reliability coefficient test indicates how well the items in a set positively correlated with one another. Variables can be considered reliable if Cronbach's alpha value was set to 0.7 and above (Hair, William, Barry, & Rolph, 2014; Pallant, 2016).

Table 1 depicts that an academic performance construct was represented as the highest Cronbach's alpha value with α =0.910. Meanwhile, the values of other variables were highly satisfactory for all subscales (α > .70). Therefore, all constructs are considered acceptable based on the evaluation of internal consistency because each alpha value of the Cronbach exceeds the required threshold.

Table 1: Reliability Results with Cronbach's Alpha Coefficient

Variables	Cronbach's Alpha	Items
Body Mass Index (BMI)	.768	7
Blood Pressure	.791	9
Glucose Level	.859	12
Academic Performance	.910	16

4. Discussion

Table 2 reports that the respondents in this study are dominated by the female (65.6%) compared to male (34.4%). Respondents also were categorised into two different age groups distribution. The majority of the respondents involved in this study were in the group of age between 19 and 23 years old (77.4%). Besides, there are only 21 respondents (22.6%) were at an age of more than 24 years old. Table 4 also shows that the respondents who participate in this study are Malay (81.6%), followed by Indian (15.1%) students. The majority of respondents are in the third year of study (72.0%). Finally, the least participation is in the first year of study (9.7%).

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Table 2: Respondent's Profile

Profile	Characteristics	Frequency	Percentage (%)
Gender	Male	32	34.4
	Female	61	65.6
Age Group	19 – 23 years old	72	77.4
	More than 24 years old	21	22.6
Race	Malay	76	81.6
	Chinese	2	2.2
	Indian	14	15.1
	Others	1	1.1
Year of Study	First Year	9	9.7
	Second Year	17	18.3
	Third Year	67	72.0

4.1 The Level of Students' Academic Performance

This section reports and discusses the findings of the study that relate to the first research objective, to identify the level of academic performance of BHRM students at the Universiti Selangor, Malaysia. Figure 2 reveals the descriptive statistics result on the level of students' academic performance in terms of the Cumulative Grade Point Average (CGPA). The result shows that majority of the respondents involved in this study achieve a CGPA of between 3.00 and 3.49 pointer (43%), followed by a CGPA of 2.50 and 2.99 pointers (29%). None of the respondents get a CGPA of less than 2.00 pointer.

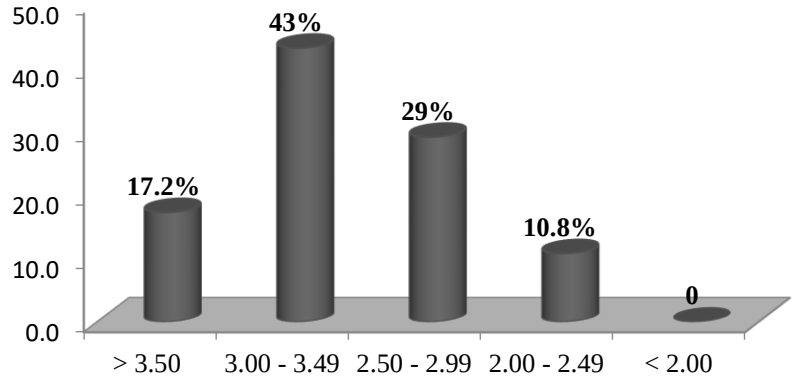

Figure 2: Current CGPA of Students' Academic Performance

4.2 Multicollinearity

Next, multicollinearity testing was done to examine the relationships among the independent variables. Multicollinearity exists when the independent variables are highly correlated, with an *r* value of more than 0.9 (Pallant, 2016). The correlation coefficient results between the variables are indicated in Table 3. All the independent variables show at least

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some positive relationship with the dependent variable, and the correlations between independent variables are less than 0.7.

Table 3: Pearson Correlation Coefficient Results

	Performance	BMI	Blood Pressure	Glucose Level
Performance	1			
BMI	.159^{NS}	1		
Blood Pressure	.391***	.336***	1	
Glucose Level	.391***	.480***	.686***	1

Note: Correlation is significant at *** 1% level, ** 5% level and * 10% level, respectively, using two-tailed tests.

To further check for multicollinearity, a collinearity diagnostics test (tolerance and VIF values) was conducted. As shown in Table 4, the tolerance values are greater than 0.10 and the VIF values are lower than 10; hence, no multicollinearity problem exists (Pallant, 2016).

Table 4: Collinearity Diagnostics Results

Variables	Collinearity Statistics	
	Tolerance	VIF
Body Mass Index (BMI)	0.769	1.300
Blood Pressure	0.529	1.889
Glucose Level	0.459	2.178

4.3 The Relationship between Health Status and Students' Academic Performance

This section reports and discusses the findings of the study which relate to the second research objective, to determine the relationship between health status and academic performance of BHRM students at the Universiti Selangor, Malaysia. The summary results of the standard multiple regression analysis on the relationship between health status and students' academic performance are presented in Table 5. The regression of model ($F(3, 93) = 6.616$, p value = .000***) is significant at 1%, and the overall fit of the model is low with an R^2 value of 18.3% of the variation in the students' academic performance. This indicates that the predictor variables in the model explained approximately only 18.3% of the total variability in the students' academic performance.

Based on Table 5, Body Mass Index (BMI) is negatively related to student's academic performance ($t = -0.367$, $p > 0.05$), and this association is not significant. Thus, this result does not support H_1. This result indicates that the BMI of students does not affect their performance in academics. Respondents reveal that they always maintain their diet routine and eat healthy food in their daily life. Besides, they also maintain a good lifestyle habit by monitoring their fatigue level. This is consistent with previous findings that there was no correlation between BMI and academic performance among students from Taif city (Alswat et al., 2017). When these students can maintain their BMI level, it will positively affect their self-confidence and quality of life (Torrijos-Niño et al., 2014).

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Table 5: Standard Multiple Regressions on the Relationship between Health Status and Students' Academic Performance

	Hypotheses	Std. Beta Coefficient	*t*-statistic	*p* value
Intercept			6.506	.000***
Body Mass Index (BMI)	H_1	-0.040	-0.367	.714^{NS}
Blood Pressure	H_2	0.232	1.760	.082*
Glucose Level	H_3	0.251	1.775	.079*
Model Summary:				
R^2 value				18.3%
Anova Results:				
F-value				6.616
Sig. value				.000***
Obs.				93

Note: Association is significant at *** 1% level, ** 5% level, respectively, using two-tailed tests *10%.

Next, blood pressure is positively related to students' academic performance (t = 1.760, p < 0.10), thus marginally supporting H_2. This is consistent with the prediction that blood pressure might affect students' performance in their academics. Respondents perceived that they have their unique hobby as a way to reduce stress and the most important is they maintained their sleep about 7 to 8 hours every day. Besides, they also do physical activity twice a week as a routine. This result is also in tandem with previous studies that found adequate physical activity and sleep have positive associations with academic achievement (Hou et al., 2020). Perhaps, students who experience stable blood pressure have no difficulties in academic tasks and relationships with parents and peers, as well as increase interest and involvement in daily activities and responsibilities (Pachaiyappan & Siranjeevi, 2018). These students also tend to have fewer health complaints such as fatigue, abdominal pain, and headaches which might disturb their study (Muhammed et al., 2018).

Finally, the findings marginally support H_3 with a significant positive association between glucose level and students' academic performance (t = 1.775, p > 0.10). This result indicates that the perceived stability of glucose level positively influences students' academic performance. Respondents reveal that they wisely choose their foods and take only a well-balanced diet to enable them to achieve optimal blood sugar levels. In addition, they also tried to maintain optimal weight by measuring their weight regularly. This indicates that they are health conscious especially since the majority of the respondents in this study are female. This is consistent with prior research, which found individuals whose glucose levels are frequently within the target range are at the lowest risk for performing below their true academic potential (Knight & Perfect, 2019).

5. Conclusion

This study has shown that a significant relationship exists between blood pressure, glucose level, and academic performance of BHRM students at the University Selangor, Malaysia. This university's students have above average academic performance as the majority of the respondents scored a CGPA of between 3.00 and 3.49 pointer, which manifests in the achievement of their academic goal. Further, the glucose level was found to be the most significant predictor for academic performance, which is in line with some studies

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(Griggs & Morris, 2018; Knight & Perfect, 2019). This indicates that the perceived stability of glucose level positively influences students' academic performance. Besides, maintaining a good lifestyle habit, a balanced diet, enough sleep, and regular physical activity are among the activities done by the students to achieve a good health status. This shows that, with an improved level of health-conscious, health issues are reduced, and that ultimately improves academic performance.

This study is significant to the education stakeholders, national policymakers such as the Ministry of Higher Education, and lecturers to take initiative to deal with health concerns among university students, as well as create awareness and educate students on the disorders. Therefore, to maintain the good health status of students in the higher education setting is necessary to promote the practice of self-adjusting their self-awareness of their health condition. Based on the findings of the study, the following recommendations are made. First, it is generally recommended to provide and promote physical activity in higher education settings. According to Durrani and Fatima (2015), physical activity has been recommended as a tool for developing students' cognitive activity which has positive effects on the brain. Therefore, the importance of physical activity has to be kept in mind while designing the curriculum of an educational institution, as it aims at increasing the academic performance of students by decreasing depression, stress, and anxiety; and by enhancing self-esteem. Second, university administrators at all levels should introduce coping strategies that would help students to overcome whatever stress they might experience. As the ability to cope with this stress is what will help them to achieve success in their academics.

However, the findings need to be interpreted with consideration for their limitations. First, the generalisation of the results may be limited as this study is conducted in a single university. Besides, this study only focused on the students in the programme of BHRM. Therefore, the findings will reflect the health status and academic performance among these students only. Future research is encouraged to extend the sample including all students in this university or comparison with other universities. Second, the instruments for assessment that were used in this study are all subjective measures, as they are self-report measures of Body Mass Index (BMI), blood pressure, glucose level, and academic performance of the respondents. Future research could measure the underlying constructs with additional objective measures. Besides, future studies should point towards other psychosocial issues that could be acting as predictors to academic performance such as stress, depression, or self-esteem. Another limitation of the study is that there is no mediation variable considered in this study. It is suggested that age could be taken as a moderator to present the study in a different way i.e., the multiplicative effect could also be included. All such limitations could be taken into account in future research.

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